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THE DESCRIPTION AND LIFE HISTORY OF A NEW SAWFLY, STERICTIPHORA APIOS (ARGIDAE : HYMEN.).

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The species described in this paper was first collected in 1930 as larvae feeding on the ground bean (*Apios tuberosa*), at Sherman, twelve miles north of Springfield, Illinois. The ground bean was growing along a railroad embankment and formed a patch probably fifty yards long and five or six wide. Rearings of adults were made from this area in 1930 and 1931, but in the summer of 1931 the area was burned over and the species was apparently exterminated in that locality.

Stericiphora apios, new species.

Female.—Length 6 to 7 mm. Head and antennae black; thorax with the following parts black: cervicum and prosternum, meso- and meta-pectus, a triangle occupying most of the praescutum, and the exposed part of the post-notum; abdomen yellow with the sutures of the basal plates, the sheath and its basal sclerites, black. Legs (including coxae) dark blackish brown, with the front tibiae and tarsi paler. Wings infuscate with brown at base, the infuscation gradually shading into grayish at the apical margins; veins and stigma dark brown or blackish. The coxae, clypeus and supraclypeal area may have areas of yellowish red on them, but this condition is not general.

Body short and very robust; head moderately robust, slightly wider than distance between tegulae.

Head seen from above three-eighths as long as wide; clothed with fine, silky pubescence; polished, sometimes clypeus and supraclypeal area sufficiently striate to be dull. Mandibles scythe-like, as in Fig. 5. Labrum short but wide, broadly rounded in front. Clypeus wide, slightly emarginate over its entire width; moderately convex, sometimes distinctly carinate down the meson; entire surface covered with moderate, distinct punctures. Supraclypeal area tapering from a broad base to an elevated crest in the side of which the bases of the antennae are inserted; punctured similarly to clypeus; both of them sometimes faintly striate. Region between this crest and the eyes hollowed out, forming a declivous basin terminated at one end by the pretentorina and at the other by the supratentorina. Moderately deep furrows extend from this point to the posterior margin of the head. Ocellar region raised, its lateral margins rounded, the median ocellus surrounded by a very narrow depressed area which

extends anteriorly as a narrow line and becomes confluent with the small ovate median fovea. Head behind eyes robust but not produced laterally beyond eyes. Antennae variable in length, third segment from one-fifth shorter to one-fifth longer than width of head across eyes; clothed with short, close, stiff pubescence; widest near base, of almost equal thickness to near apex, then either tapering to a point or terminating with a blunt end.

Thorax polished, with only sparse pubescence. Venation of wings as in genotype and allied species in the genus. Legs short, tarsal claws simple.

Abdomen with a noticeable sheen. Sheath (Figs. 12, 13) very broad, the apex with lateral processes raised above the sheath surface and not confluent with it, the base and sides of the sheath with fine hairs, the processes with conspicuous and abundant hairs.

Male.—Length 5.5 to 6.5 mm. Head and antennae entirely black; pronotum yellow, tegulae yellowish, remainder of thorax black; abdomen reddish yellow with parts of the sutures of the basal plates and portions of the caudal segment and genitalia, black. Legs and wings as in female.

Similar in structure to female, with the following antigenetic differences: third antennal segment of antennae bifurcate to base, lyriform; male genitalia with claspers broad and rounded at apex, and with the lateral aspect of the penis valve as in Fig. 11.

Holotype.— ♀; Sherman, Illinois, May 22, 1930 (H. H. Ross). Reared from *Apios tuberosa.* In the collection of the Illinois State Natural History Survey, Urbana, Ill.

Allotype.— ♂; same data.

Paratypes.—14 ♂♂, 28 ♀♀, from Sherman, Ill., collected as adults or larvae May 22, 1930 (H. H. Ross), or May 17, 1931 (Ross and Mohr), those collected as larvae reared at Urbana, Ill., on *Apios tuberosa;* 1 ♀, same locality, May 23, 1930 (T. H. Frison); 1 ♀, Urbana, Ill., May 9, 1916 (C. S. Spooner). Deposited with the holotype.

This species is most closely related to *S. nigriceps* (Konow), but differs from it in the sharper carina of the supraclypeal area, in having the median fovea connected by a narrow, depressed line to the ocellar basin, and in the female by the differently shaped and detached lateral process of the sheath (Figs. 12, 13 and 14). The female may be distinguished from all other species by the shape of the sheath, but good characters for the separation of the males in this group have not yet been worked out.

Sterictiphora apios form **atrescens,** new form.

Male and female structurally identical with the typical form. Differ in color in having the abdomen entirely black except for the ventro-lateral plates of the terga and membranous areas on the basal plates which are sometimes yellowish. In addition, the males sometimes have small, diamond-shaped, yellowish areas on the venter.

Holotype.— ♀; Sherman, Illinois, collected as larva May 17, 1931 (Ross and Mohr), reared from *Apios tuberosa.*

Allotype.— ♂; same data.

Paratypes.—2 ♂♂, 4 ♀♀, same data; 1 ♂, same locality, collected May 22, 1930 (H. H. Ross); 1 ♂, same locality, May 23, 1930 (T. H. Frison). Types deposited with those of the typical form.

This dark form is apparently only a melanic genetic combination, having been reared from the same batches of larvae as the typical form. No intergradations between the two forms have yet been observed. The female can be distinguished on the basis of the sheath, but the males have not yet been satisfactorily keyed out.

DESCRIPTIONS OF IMMATURE STAGES.

Egg.—Length 1.1 mm., width 0.7 mm. Shape ovoid, round-elliptic in cross-section. Membrane white and thin.

First instars of larvae.—Structure and setation similar to full grown larva; differ in appearance in that the body tubercles are more prominent.

Larva, full grown.—Length 17 mm.; head 2 mm. wide. Color of head gray yellow orange with gray orange mottling; body yellowish green to bright green with dark brown tubercles, brownish areas on the thoracic legs and at their base, and with the epiproct brown.

Head (Figs. 1, 2) with sparse setae. Epicranial suture curved slightly to left. Front pentagonal, bearing about ten prominent setae arranged symmetrically around the margin. Occipital areas with a group of about twelve similar setae forming a semicircle from one antenna to the other, arching over the front. Eyes prominent, black. Antennae (Fig. 6) plate-like, with five large pores and one small one, and three small, circular opaque ares. Labrum mostly membranous. Clypeus dark brown, with two pairs of prominent setae. Epipharynx (Fig. 3) with four central pairs of pointed setae, marginal area with about fourteen pairs, the eleven apical setae apparently modified into sense organs.

Mandibles (Fig. 4) robust, right one with four teeth, the left with five. A portion of the mesal area of the left mandible is modified into a membranous area covered with a brushy setation. This undoubtedly is a prostheca. The right mandible has a corresponding brushy area but not situated on membrane. The left mandible also has a well defined ventral side, which is not angulate in the right mandible. Maxillae as in Fig. 10; palpi five segmented, the second and third narrowed on opposite sides; galea horn-shaped; lacinia blunt, with apical teeth similar to distal teeth of epipharynx; stipes and cardo present as chitinized plates. Labium (Fig. 9) with three-segmented palpi, the third segment extremely small; totaglossa large and spadiciform.

Alitrunk (Fig. 1) with smooth epidermis conspicuously studded with nipple-like tubercles, each tipped with a spine. General appearance cylindrical, of about equal diameter throughout, except the prothorax and anal segments which are smaller. Segments 2 to 7 of abdomen slightly greater in diameter than remainder of body.

Prothorax with two annulets; the first consisting of only the pleural region with a large spiracle, three tubercles above it and three below; the second consisting of the tergum only, bearing 6 pairs of tubercles. Meso- and metathorax similar, four annulets present on dorsum, with 2, 1, 4 and 4 pairs of tergal tubercles respectively; pleuron with a reduced spiracle and 6 tubercles; the mesopleuron with a small, pore-like structure caudad of the tubercles. Legs distinct on all three segments, articulating with distinct hypopleurites. Prothoracic leg distinctly four segmented, coxa large, femur and tibia smaller and sub-equal, tarsus still smaller, pad-like, with an anterior claw. Meso- and metathoracic legs similar to each other, but larger than the prothoracic legs, and with femur and tibia very closely united, approaching a fused condition.

Abdomen with ten visible segments, the first eight with a pair of spiracles, segments 2 to 7 with pair of distinct larvapods, segment 8 with a minute pair, and segment 10 with a large pair. Typical annulation, etc., of a segment as follows (Fig. 1, "3"); three annulets, the anterior one complete, the last two evident only on the tergum and sternum. Annulets with 2, 4 and 4 pairs of tergal tubercles respectively, 2 and (representing two annulets) 9 pairs of lateral tubercles and 0, 4 and 3 pairs of sternal tubercles. The ventro-tergal tubercle on the third annulet is very small. The first annulet of the first segment is reduced to the tergal region; the ninth segment has only indistinct annulation, a reduced number of pleural tubercles, and has a tubercle in place of a larvapod. The tenth, or last, segment is greatly modified, having no apparent annulation; the posterior half is a prominent epiproctal region (Fig. 8) with 2 pairs of large apical setae; the anterior half bearing 7 prominent pairs of tubercles. The region below the anus bears a lunate, semi-sclerotized area with four pairs of long setae, two pairs slender and inconspicuous, the other two much more prominent. The legs of this segment are, as usual, thick and stubby. They bear a ring of small tubercles around the base, below the hypoproctal region.

Prepupa.—Similar to previous larva in size, structure and color, differing slightly in having the tubercles slightly wider at the base but not so tall.

Descriptions drawn up from about 60 larvae of all stages reared on *Apios tuberosa* at Sherman, Ill., May, 1930 and 1931; preserved in alcohol.

This larva resembles in color the larvae of *S. cellularis* (Say) and *S. prunivora* (Dyar), but differs from them in the well-developed epiproct and the arrangement of spines on it. The head, also, is darker than other reared species in the genus.

LIFE HISTORY NOTES.

In order to make these observations, larvae and pupae were brought to Urbana and placed upon potted plants of the ground bean. These plants were kept in an open west window which afforded good ventilation and plenty of sunlight. The time given for the duration of the various stages is therefore typical of the May and June temperature in this vicinity.

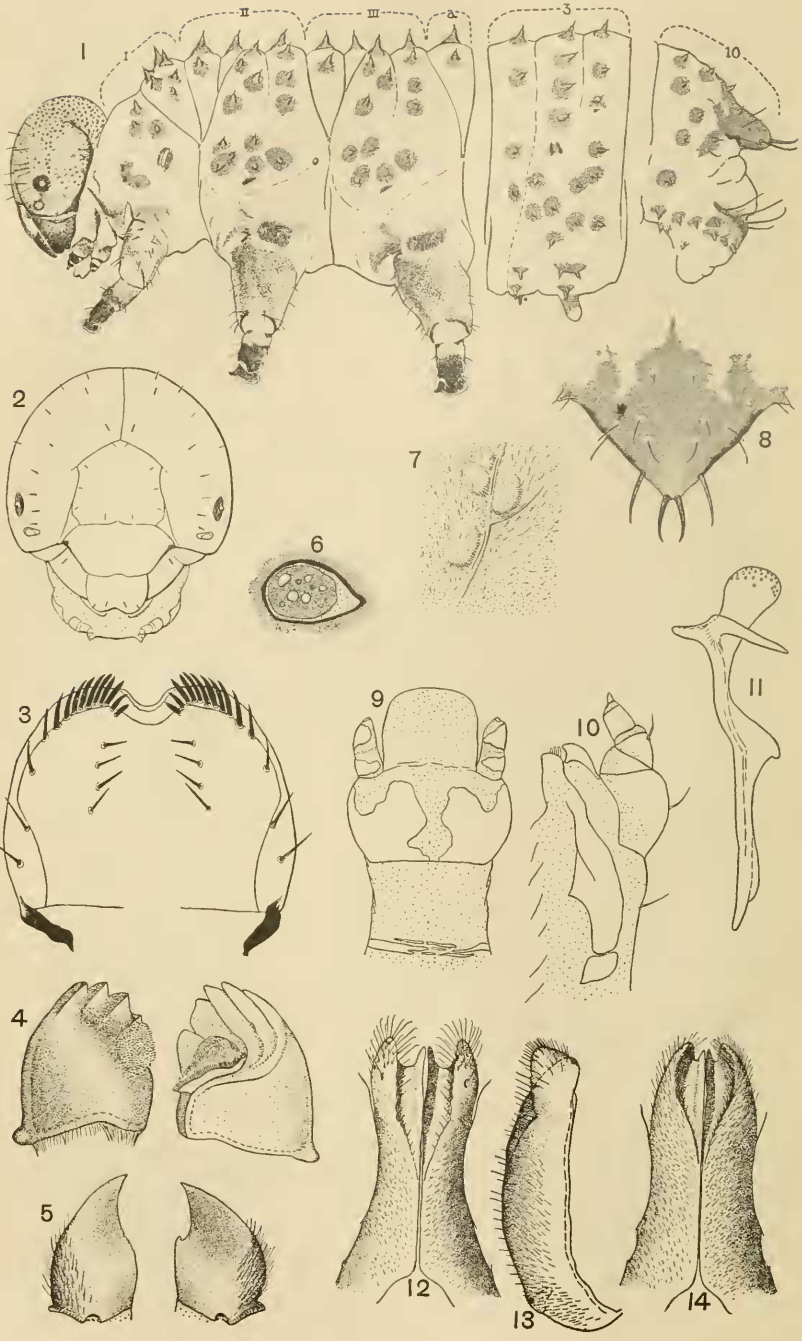
The eggs (Fig. 7) are laid within the tissues of the leaf, deposited in an incision made along a lateral vein on the under side of the leaf. They appear like nodules under the epidermis, and when abundant present a very curious appearance. They hatch in about four days. Immediately the larvae begin feeding upon the leaves of the plant. Their legs, both thoracic and abdominal, are well developed, and with them the insect clings most tenaciously along the edge of the leaf. The entire thickness of the leaf is eaten, and a heavy infestation will strip the plants of all their foliage except the heavier veins and stems. The black markings of the larvae are present on the earliest instars and a group of larvae feeding together make a conspicuous picture.

The number of instars is not known, but the entire larval period is passed in about ten days. This is very rapid development compared to that of most sawflies which have been studied. There is very little variation in the size of members of each brood. After becoming full grown the larvae do not wander to any extent, but construct their cocoons upon either the same plant upon which they feed or a nearby one. In this latter case it is often upon some other plant species, such as grasses or sweet clover. The cocoons are made from a rather coarse silk which becomes brittle and hard soon after exposure to the air; the color is at first white but finally turns rich brown. They are attached to leaves or stems at varying distances from the ground but usually on a part of the plant exposed to sunlight. Most frequently they are made in a terminal bunch of small leaves which are pulled together around the cocoon.

Within the cocoon the larva changes in two or three days to the pupa, which in another four to six days emerges as the adult. The total period within the cocoon is from six to nine days, averaging seven or eight. This gives a total period of development, from egg-deposition to the emergence of the adult, of twenty-two days, or slightly more than three weeks.

The adults, judging from the few studied in cages, are not very long-lived, dying in less than a week. Copulation and egg-laying took place in the rearing cages three days after emergence, all the eggs being laid on the third day.

The feeding habits of the adults are very interesting. They eat the luxuriant pubescence on the leaves of the host plant just as a cow crops grass. The scythe-shaped mandibles (Fig. 5) are used in the cutting operation. The sawfly, when feeding, stands at one point, crops the pubescence in front of it in a semicircular swathe, then steps forward and repeats the process until the leaf is denuded. In vials in the laboratory the pubescence was eaten from either side of the leaf. This is the first time such a feeding habit has been recorded for a sawfly. I have, however, previously observed the same habit with the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adults of *Pteronidea mendica* (Walsh), in which the mandibles are also sickle-shaped. In all likelihood this will prove to be a common habit in certain sawfly groups.

List of Illustrations and Abbreviations.

Figures 1—13, *Sterictiphora apios*, n. sp.:

Fig. 1—Lateral aspect of head, thorax, and third and tenth abdominal segments of larva.
Fig. 2—Front view of head of larva.
Fig. 3—Epipharynx of larva.
Fig. 4—Meso-ventral view of mandibles of larva.
Fig. 5—Dorsal view of mandibles of adult female.
Fig. 6—Antenna of larva.
Fig. 7—Portion of leaf of *Apios tuberosa* with sawfly eggs beneath the epidermis.
Fig. 8—Dorsal aspect of epiproctal region of larva.
Fig. 9—Ventral aspect of labium of larva.
Fig. 10—Ventral aspect of maxilla of larva.
Fig. 11—Lateral aspect of penis valve.
Fig. 12—Ventral aspect of sheath.
Fig. 13—Lateral aspect of sheath.
Fig. 14—*Sterictiphora nigriceps* (Konow), ventral aspect of sheath.
I, II, III = first, second and third thoracic segments respectively.
a = first annulet of first abdominal segment.
3, 10 = third and tenth abdominal segments respectively.

Figures 1, 2, 7 and 8 were drawn by Mr. C. O. Mohr, of the Illinois State Natural History Survey.

NOTES ON THE TACHINID GENUS ELODIA R. D., WITH THREE NEW SPECIES OF ELODIA AND PHOROCERA (DIPTERA) FROM JAPAN.

By J. M. Aldrich, *National Museum.*

The new species here described were received by the Bureau of Entomology from G. J. Haeussler and turned over to me for identification. All the specimens were reared in Japan and Korea (Chosen) from larvae of the Oriental Fruit Moth (*Grapholitha molesta* Busck).

ELODIA ROBINEAU-DESVOIDY.

Elodia Robineau-Desvoidy, Dipt. Environs Paris, vol. 1, p. 936, 1863.—Stein, Arch. Naturgesch, 90, 144, 1924.—Villeneuve, Ann. et Bull. Soc. Ent. Belgique, vol. 69, p. 182, 1929.

Robineau included three new species, all of which are considered a single species by Bezzi in vol. 3 of the Palaearctic